CHAPTER 1

INTRODUCTION

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Air conditioning systems are essential in most of our daily lives. Our expectations of such systems have been raised to demand more than just temperature control, and it is increasingly desirable to apply these systems in varying situations and environments. As sunlight hits the windshield, enters the car, and heats up the interior, the air inside warms up, and the windows warm up. The windows, because they are now hotter than the air outside, transfer heat back to the air around the car (heat moves from hotter bodies to colder ones, and the bigger the difference, the faster the heat moves). So the 'steady state' is reached when the amount of heat going into the car equals the amount of heat going out of the car [2] .

The hotter the inside temperature, the more heat will be transferred to the surroundings. Thus, when the car is cool, the sun will heat it up more quickly, but eventually it will heat up so much that the heat gained from the sun is matched by the heat lost to the air. Other factors that matter are the presence of wind (just like wind cools you faster, it will cool your car faster too).

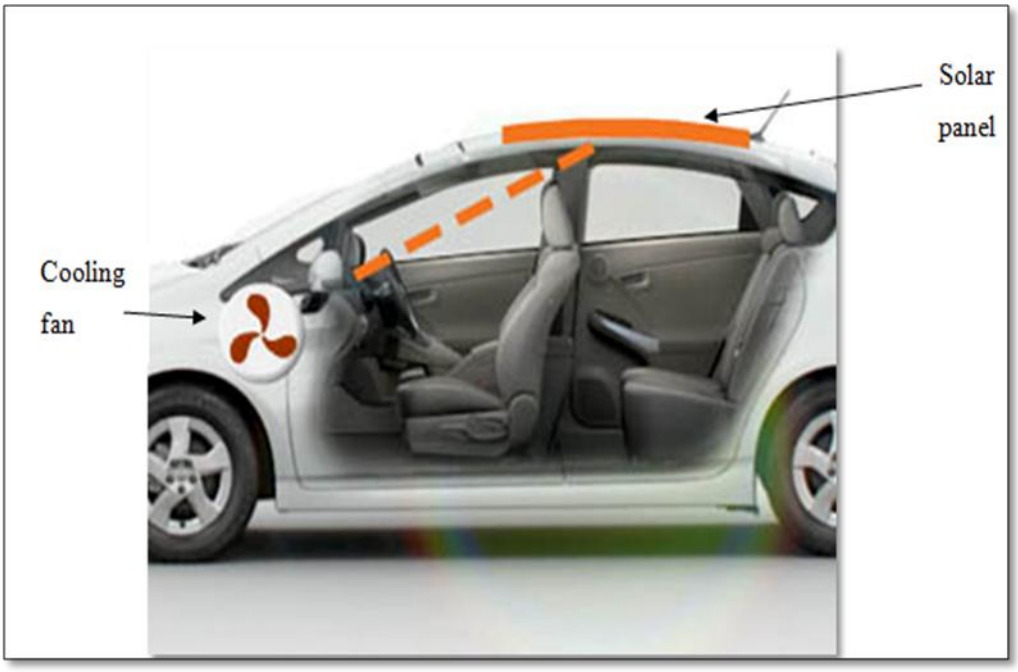

Figure 1.1: Model of a car using cooling fan to remove hot air out

Figure 1.1 shows model of a car that using cooling fan to control interior vehicle temperature when car is in parked condition under the sunlight. With regards to both driver and passenger comfort and safety, a lot of factors must be taken in account. A comfortable and safe environment is often difficult to define and affected by sometimes contradictory factors. Fuzzy logic control provides an effective and economic approach to this problem. Fuzzy controllers incorporated in the latest model automobiles designed by Japanese auto makers provide proof that temperature control in diverse environments can be solved. The key to a good solution lies in thorough analysis of factors affecting the control target and the kinds of sensors and sensing techniques used to detect these factors [1]. Fuzzy logic does not necessitate a mathematical model of the system and yet capable to provide non-linear relationship induced by membership functions, rules and defuzzification. These features make fuzzy logic promising for process control where conventional control technologies do a poor job and human operator experience exists. By these reasons, fuzzy controller is used to control air conditioners in a climate control system.

Knowledge base of the fuzzy carries out rule inference based either on human experience or an operator control actions in the form of if-then rule structure. On the other hand, the inference will do the decision-making action based on the obtained input conditions and rule in the knowledge base. The resulting is actually a non-linear relationship rather than a logic relationship.

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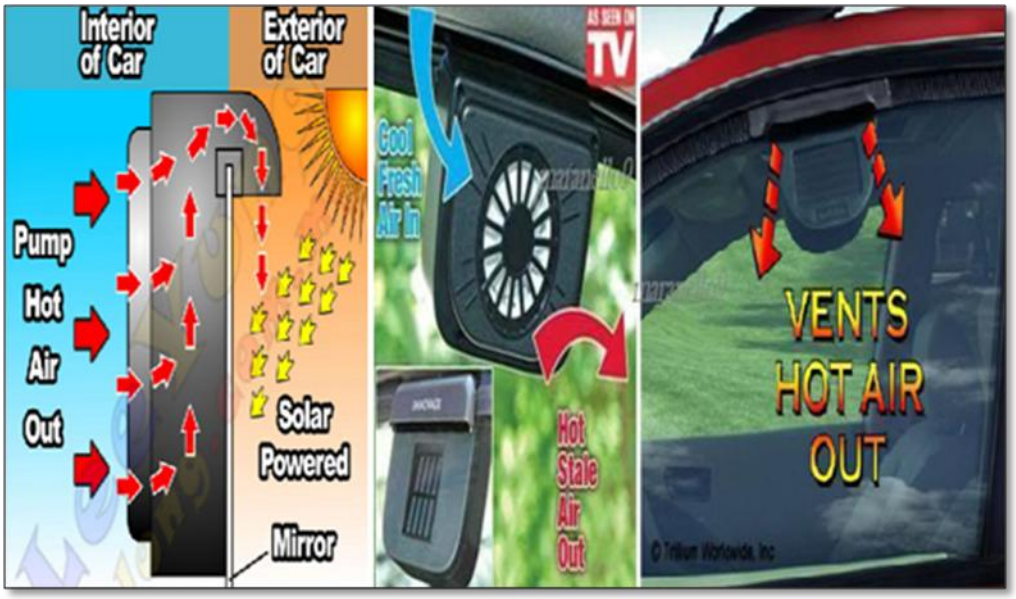

Figure 1.2: Solar powered to run the cooling fan